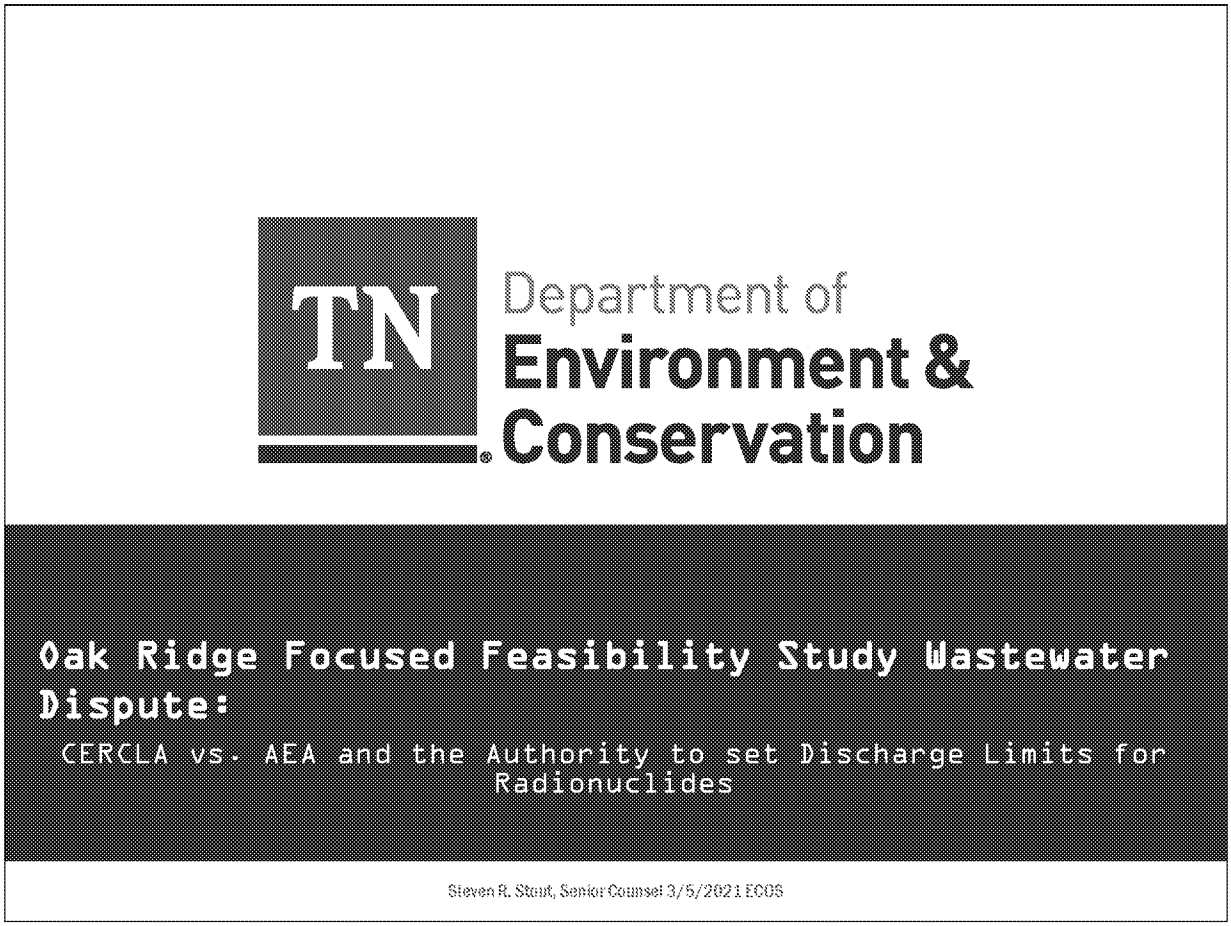
TN
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Oak Ridge Focused Feasibility Study Wastewater Dispute:
CERCLA vs. AEA and the Authority to set Discharge Limits for Radionuclides
Steven R. Stout, Senior Counsel 3/5/2021 ECOS

Hello.

# Background : Oak Ridge Reservation

- Oak Ridge – Manhattan Project origins of three parts of the site: Y-12, K-25 and X-10
- K-25 – large building name also site name former use for uranium enrichment by gaseous diffusion process
  - now East Tennessee Technology Park (ETTP); no current mission
  - a legacy site Community Reuse Organization of East Tennessee (CROET) and land transfers
- X-10, the Oak Ridge National Laboratory (ORNL),
  - a continuing mission site for scientific research ;
- Y-12, National Nuclear Security Administration(NNSA),
  - continuing mission: maintain nuclear weapons arsenal including repository for highly enriched uranium and massive new uranium processing facility (UPF) under construction
- Oak Ridge Environmental Management (OREM) touches all three sites and other areas on ORR used for disposal like Bear Creek Valley west of Y-12
  - ETTP first in line ; early 2000's accelerated cleanup plan goal not achieved and now different contractor completing Vision 2020 and working on Vision 2024
  - Complications of working around continuing missions and modernization for CERCLA under authority of CERCLA 120 Federal Facilities Agreement (FFA) and under state hazardous statutory authorities corresponding to RCRA and CERCLA

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A lot of history. Interesting stories about Manhattan Project and then the Cold War. Uranium enrichment at K-25 first gaseous diffusion plant, first for weapons then commercial reactor fuel

but then working with wider array of radioisotopes as the missions began to evolve.

So, here is the setting but within the large setting is a valley Bear Creek Valley and the small creek for which the valley is named

Older area called Bear Creek Burial Grounds

A lot of other disposal areas there

And then sites for engineered RCRA Subtitle C class onsite disposal

But the geologic setting is problematic because of the prevalence of karst limestone

And even in other layers of rock the upheaval of maintains and valleys and times have created fractures where there is a rapid water flow similar to karst

# Background: Onsite Disposal

- Concept for centralized onsite disposal to facilitate other CERCLA response actions in 1990's
- Environmental Management Waste Management Facility (EMWMF)
  - Authorized by 1999 Record of Decision (ROD) signed by three parties to FFA authorizing development of an onsite waste disposal facility
  - meant to receive different types of for disposal of wastes in three main categories from other parts of ORR, and used predominantly for demolition debris and to lesser extent soils from ETTP site
  - Sited under CERCLA through onsite permit waiver, sec. 121(e) as hybrid disposal site meeting the substantive Applicable and Relevant and Appropriate Requirements (ARARs) of three major environmental regulatory statutes:
  - Atomic Energy Act (AEA) for low level radioactive wastes
  - Resource Conservation and Recovery Act ( RCRA) hazardous waste and mixed wastes
  - Toxic Substances Control Act (TSCA) – PCBs
  - More recent proposal last decade for new similar facility, Environmental Management Disposal Facility (EMDF)

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Not good setting

But centralized disposal promised as lesser evil

Reduced contaminated footprint in one area and consolidate to engineered double lined facility in a valley already messed up with contamination

Versatility

# Landfill Wastewater Discharges

- Now leading up to the dispute which was over limits for discharges of radionuclides existing and a proposed new landfill to Bear Creek, which is small creek that from headwater to mouth lies within the boundaries of ORR
- Two types of landfill wastewater: leachate and "contact water" and the EMWMF ROD assumed treatment of leachate at another ORR facility to which the leachate was transported by tanker trucks
- But from the beginning 2002-2003 experienced problems with managing the larger volume (10x) of "contact water", i.e., contaminated stormwater, and practice allowed for direct discharge to Bear Creek after sampling
- Practice of direct discharge did not occur without knowledge of regulators, but there was no provision for it in the EMWMF ROD and, hence, the matter of discharge limits was never addressed in the context of the FFA in primary document

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But East Tennessee is also wet. It rains a lot and there is an issue for management of the storm water that can run into the landfill even as much of the flow from outside the landfill is diverted much does fall into the open waste area

And a problem with what to do with all the water

And it led to an argument about whether the water required treatment

# Setting Limits

- DOE complied with its own internal order – now 458.1under its "self-regulating authority" under the AEA but not under the CERCLA decision
- Used sets of numbers called Derived Concentration Standards ( DCS) similar to NRC's approach
- AEA is different than CERCLA: dose-based vs. risk-based (and ARAR-based)
- EPA issued guidance in 1997 challenging proposed nuclear reactor site
  - decommissioning regulations by Nuclear Regulatory Commission (NRC) which regulates commercial and utility nuclear reactors but not DOE under AEA
  - Allowed Dose of 25 millirem above the CERCLA risk range CERCLA 121 and 40 CFR 300.430 - 1 x 10-4 to 1 x 10-6
  - Most DOE and NRC limits were outside the risk range as translated by EPA to 15 ( later 12) mrem at upper end of range
  - One NRC regulation specific to low level waste disposal sites calculated dose differently ,10 CFR 61.41 25/75/25

    25 millirems to the whole body,
    75 millirems to the thyroid, and
    25 millirems to any other organ of any member of the public

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Different regulatory regimes

## CWA does not regulate radionuclides covered by AEA but CERCLA does

1976 Supreme Court of the United States decision upheld EPA's exclusion of "source, byproduct and special nuclear materials" regulated under AEA

CERCLA 1980 section 101(14), as amended, defines "hazardous substance" by referencing other environmental statutes, including: CAA sec. 112 NESHAP covering radionuclides

not mentioning the AEA

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Sort of oblique way to bring radionuclides into the definition scope of hazardous substances but it did

In Rome do as Romans do

In CERCLA do as CERCLA requires

Not AEA

# Resolving the Issue

Finally, the issue of discharges from the existing landfill would be addressed

As part of another earlier dispute DOE agreed to develop a Focused Feasibility Study for the wastewater discharges.

When the D2 document was submitted neither TDEC nor EPA approved the document. Radionuclide discharge limits was one of the issues in the document.

There was disagreement about the assumptions to be used for fish ingestion to calculate the risk using a tool EPA developed called the PRG ( Preliminary Remediation Goal) calculator. And the most restrictive pathway for CERCLA risk was via this pathway for eating fish caught in Bear Creek.

The dispute remained at the informal level from March 2016 to August 2018 when EPA elevated the dispute, framing the radionuclides issues from the overall document as ones to be addressed through the formal dispute process. And it raised the argument that the CWA requirements should be ARAR as relevant and appropriate. Earlier, there was an awareness of a similar dispute at the DOE Paducah facility in which the ARARs issued were raised but not fully resolved because of a "settlement".

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Went around and around

Different proposals

Divide the DCS by 4
assume point a little down stream

Calculate and determine risk

But risk depends on pathways and the pathway of fish and ingestion and bioaccumulation

Bigger issue for mercury which is another story

But significant issue for radionuclides as well

# EPA Region IV

At the Region IV level the decisions were needed to move forward for setting the limits at the two landfills

Issue of Preliminary Remediation Goals (PRGs).

- ❑ for EMDF the final effluent limits will be set in the ROD
- ❑ for EMWMF the PRGs inform an ESD

Region IV. August 2018 elevation letter focused use of the full Clean Water Act authority to set discharge limits. Importantly, technology-based effluent limits (tee-bell) and water quality-based effluent limits (WQBEL)(cue-bell)

When DOE elevated to Wheeler in April 2019 and supplementary material in July 2019 costs became an issue

# The March to Atlanta

The FFA parties engaged at the different levels of management for the process of formal dispute, failing to reach an agreement.

The Regional Administrator, Mary Walker, for EPA Region IV prepared a final decision In March 2019 which DOE asked the EPA Administrator, Andrew Wheeler, in Washington, DC to review in May 2019.

And there was a lot of effort over a long time to reach a "settlement" while the decision was pending under review at the EPA Headquarters

TDEC supported the underlying premise of using the CWA as a source of ARARs to be applied to regulate discharges of radionuclides by correspondence emphasizing a couple of points:

1)the recreational use classification of the creek as a potential use although not an existing one

2) The use of a consistent method of addressing toxicity and carcinogenic risk for the recreational use classification.

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# On to Washington, DC

## And the result after 19 months was split decision.

5 Issues in Administrator Wheeler 's letter and a split decision

I. scope and applicability of this decision

CERCLA decision does not apply to DOE and NRC activities solely under the authority of the AEA.

Yes, but it does call into questions decisions under that separate authority based on the rejection of the dose-based standards in the next issue.

II. Most of the NRC regulations will not be considered as relevant and appropriate. However, two standards are :
10 CFR 61.41 25/75/25 risk from all pathways to general population

61.43 Protection of individuals during operations.

Operations at the land disposal facility must be conducted in compliance with the standards f or radiation protection set out in part 20 of this chapter, except for **releases of radioactivity in effluents from the land disposal facility, which shall be governed by § 61.41 of this part**.

How is the 10 mrem divided among pathways? Use As Low As Reasonably Achievable (ALARA) approach. One of the many issues that needed to be made to implement this decision.

# CWA ARARs

III. State and Federal CWA regulations as ARAR ?

Yes, but some not all

Accepted water quality-based approach using narrative standard (no numeric exist) and recreational use of creek

i. Neither TBEL

ii. nor antidegradation

iii. Not following consistent logic so there is an analysis of factors to support the decision

iv. And attorneys for EPA complained about this issue. One said this decision as a hybrid approach was worse than all CERCLA or all CWA. And it left gray areas, leaving hard issues that caused the dispute in the first place unresolved.

# Flexibility for site-specific factors

- IV. Site-specific factors may be considered
  - Tennessee narrative criteria for recreational use sets 1 X $10^{-5}$
  - But point of exposure must be determined
  - Used flexibility to consider site-specific information to evaluate exposure risk
  - Not require default assumptions in CWA guidance regarding fish ingestion
    22 grams per day 365 days a year and 70-year life span
  - Superfund 26 years and consumption rate to be determined
    But reasonably anticipated future land use, can be considered Bear Creek Valley divided into three zones in (BCV) zones in Phase I ROD)

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# Final Issue and Summary

V. Cost implications to be developed later and argued

Without knowing the concentrations to be achieved by treatment there was not a means to estimate costs of construction and operation

Summary

Applies only to ORR

NRC regulations 10 CFR 61.41 and 61.43 are relevant and appropriate

State and Federal CWA regulations are ARAR using state's stream designated uses and classification of Bear Creek as recreational

# Next Steps

- Must use site-specific factors and use additional data collection on radionuclides in fish tissue at present and localized consumption pattern
- Costs to be developed as the FFS document is revised
- Allows parallel paths for development of the PRGs based on fish studies and continued effort to finalize EMDF ROD

# Thank You

**Question and Answer Period**

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